

Influenza Virus Vaccine

The Effect Upon an Outbreak of the Disease Among a Geriatric Population

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DURING RECENT YEARS, recommendations have been made by public health agencies to immunize certain groups within the population against influenza. In particular, persons 65 years of age and over have been advised to be immunized. In view of these recommendations, all patients 65 years of age and over in Stockton State Hospital were given influenza virus vaccine during October and November of 1962. In March, 1963, an acute respiratory illness became widespread among the patients on some of the wards. This report is concerned with the experience on one particular ward and provides data regarding the effect of immunization upon the attack rate.

STUDY POPULATION

Stockton State Hospital is a 3,700-bed, general psychiatric hospital arranged in a general cottage plan. It serves a wide geographic area in Northern California. One particular cottage, the subject of this report, houses newly admitted, ambulatory men and women who are 65 years of age and over, and has an average daily census of approximately 70 patients.

On October 1, 1962, and again on November 8, 1962, each patient on the ward received an intradermal injection of 0.1 ml of influenza virus vaccine polyvalent* Types A & B (Eli Lilly Company). Subsequently, additional new patients were admitted to the ward from their own homes or from other hospitals or institutions, but were not given the vaccine. It is possible, however, that some of the newly admitted patients may have received vaccine of this kind before admission to Stockton State Hospital.

OBSERVATIONS

From March 6, 1963, through March 21, 1963, it was noted that there was an outbreak of respiratory illness among the patients. The illness appeared to be of influenza type, characterized by a fever up to 104° F, which generally subsided in three to five

• In an outbreak of laboratory-confirmed influenza A-2 (Asian strain) on a 70-bed geriatric ward in which some patients had received influenza vaccine and some had not, 30 patients out of a total of 75 developed clinical evidence of influenza associated with fever. Of the 30 patients, 24 apparently had not received both doses of the influenza vaccine. Of 29 patients who received two 0.1 ml doses of influenza virus vaccine, six developed clinical evidence of infection, whereas, of the 46 patients who did not receive both doses, 24 developed the illness.

days. Coryza, sore throat, headache, myalgia and a non-productive cough were also generally noted. Of 75 patients on the ward during this period, 30 were identified as being sick to the extent that there was a fever of 100° F or more. In general the attitude of members of the ward staff had been that the influenza immunization program was not apparently of much value, until it was also noted that the incidence of disease appeared to be much higher among patients who had not received the vaccine.

In view of this observation, additional efforts were made to maintain records and to identify the etiological agent. The California State Department of Public Health was notified and, on March 21, 1963, a member of the staff from the Department's Bureau of Communicable Diseases and the Viral and Rickettsial Disease Laboratory collected specimens of blood and material swabbed from the throats of seven selected patients who were in the acute phase of the illness, in this and a neighboring cottage experiencing a similar outbreak.

RESULTS

As may be noted on Table 1, in 30 of a total of 75 patients on the ward clinical evidence of influenza developed, as determined by the presence of fever plus other typical physical signs and symptoms. Of these 30 patients, 24 had not received both doses of the vaccine. In six of 29 patients who had received both doses, clinical evidence of influenza developed, whereas 24 of the 46 patients who had not received both doses became ill. These were statistically significant findings ($\chi^2 = 7.34$, $p < .01$). When the patients were classified into three groups

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*Lot No. 1056-807824. Each cc contains 200 CCA units of Asian strain, 100 CCA units of PR8, 100 CCA units of Ann Arbor 1/57 and 100 CCA units of Great Lakes Strain.

TABLE 1.—Number of Patients Receiving Influenza Vaccine

	Two Doses*	One Dose	None	Total
Patients with fever†.....	6	2	22	30
Patients without fever.....	23	1	21	45
TOTAL PATIENTS	29	3	43	75

($\chi^2 = 7.68$, $p < .05$)

*Dose: 0.1 ml intradermally.

†Oral temperature of 100° F or higher.

as shown on Table 1, rather than two groups, significant statistical differences may also be noted ($\chi^2 = 7.68$, $p < .05$).

The reports from the State Department of Public Health indicated that influenza A-2 (Asian strain) was isolated in embryonated eggs from throat swabs of five of the seven patients tested. Six of the seven patients showed a rising blood titer and this was also reported as being positive for influenza Type A.

Observations were made from March 5, 1963, through May 31, 1963. There were four deaths among the observed patient population during this time. Two of the four patients received both doses of the vaccine, and both were included as a part of the six patients shown in Table 1 because of a temperature of over 100° F, even though there was minimal clinical evidence of influenza. One patient was febrile for several weeks before March and died on May 10, 1963, from multiple myeloma. The other patient had coronary occlusion on March 9, 1963, and died on March 12, 1963. Her highest fever was 100.8° F (rectal). Autopsy was done in both cases. The other two patients had not received influenza vaccine. The first patient developed a febrile illness on March 13, 1963, at a time when he was already in congestive cardiac and renal failure, and died on March 14, 1963, with evidence of severe uremia. There was no autopsy. In the other patient severe respiratory illness developed on March 6, 1963, with temperature of 103° F to 104° F, and after a stormy course

apparently recovered; but he later slipped and fell to the floor, received severe injuries and subsequently died on March 30, 1963. Autopsy was performed.

Information was reviewed regarding the severity and prevalence of influenza outside the hospital ward. The total number of hospital deaths for the month of March and the monthly totals for all months in 1962, 1961, 1960 and the first five months in 1963 were reviewed and no significant trends were noted. Provisional Reports published by the State Department of Public Health were reviewed. Apparently there was not a severe outbreak in California during the time of this report, but there was evidence of isolated, laboratory-confirmed outbreaks (California's Health, State Department of Public Health, 21:7 (No. 1), July 1, 1963).

DISCUSSION

Of primary interest in this report was the relatively low incidence of illness among patients who received both doses of the vaccine. Statistically significant differences were noted between those who received the vaccine and those who did not in terms of whether or not fever developed. The dosage of the vaccine was 0.1 ml intradermally administered. Inasmuch as no patient received 1.0 ml subcutaneously, we have no data to compare the effectiveness of the larger doses to the smaller doses. It appeared, however, from this study that the dosage and method of administration gave protection against influenza A-2 (Asian strain).

The mortality rate was low and in the four deaths that did occur among the study population, it did not appear that death was the direct result of the influenza infection.

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